

Market Stability and The Cost of Capital

**NARUC Winter Meetings
Committee on Electricity**

Presented by
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An Important Concept Has Apparently Been Missing

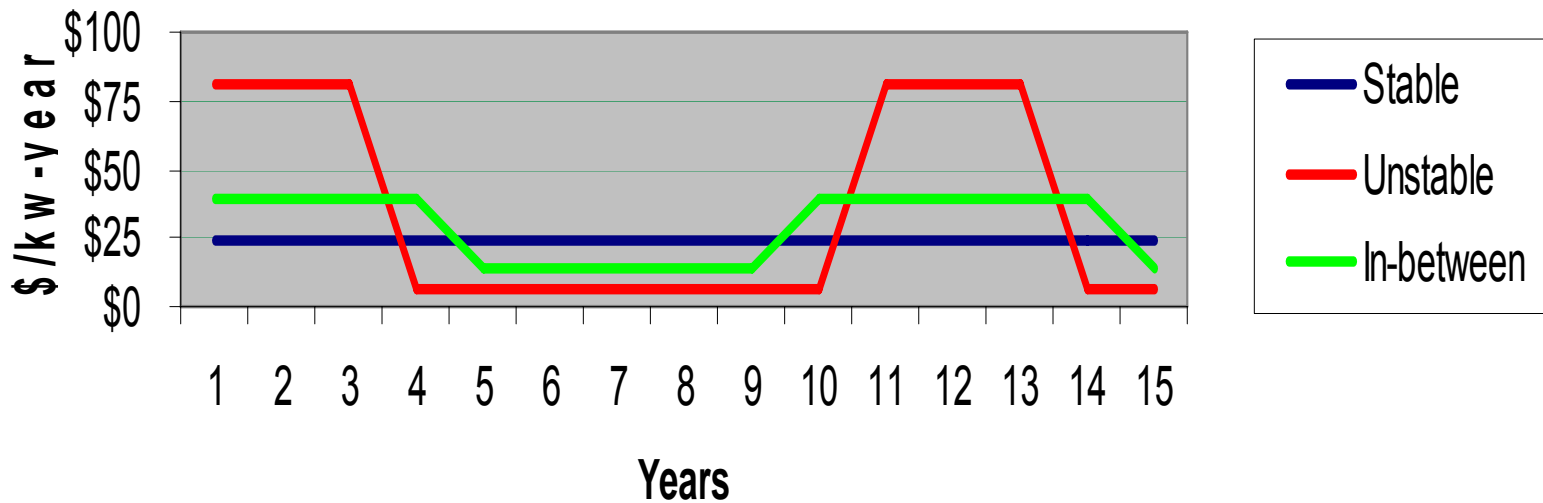
- **This is the clear link between market stability (meaning low capacity price volatility) and the cost of capital.**
- **Market stability is clearly good for consumers because it reduces the cost of capital and the capacity price.**
- **Proper design of the capacity markets can achieve market stability.**

Conceptual Framework

- 1. The structure of the markets determines cash flow volatility.**
- 2. Cash flow volatility determines the financial structure used to finance capacity additions.**
- 3. The financial structure determines the cost of capital.**
- 4. The cost of capital determines capacity prices.**
- 5. Capacity prices determine customer costs.**

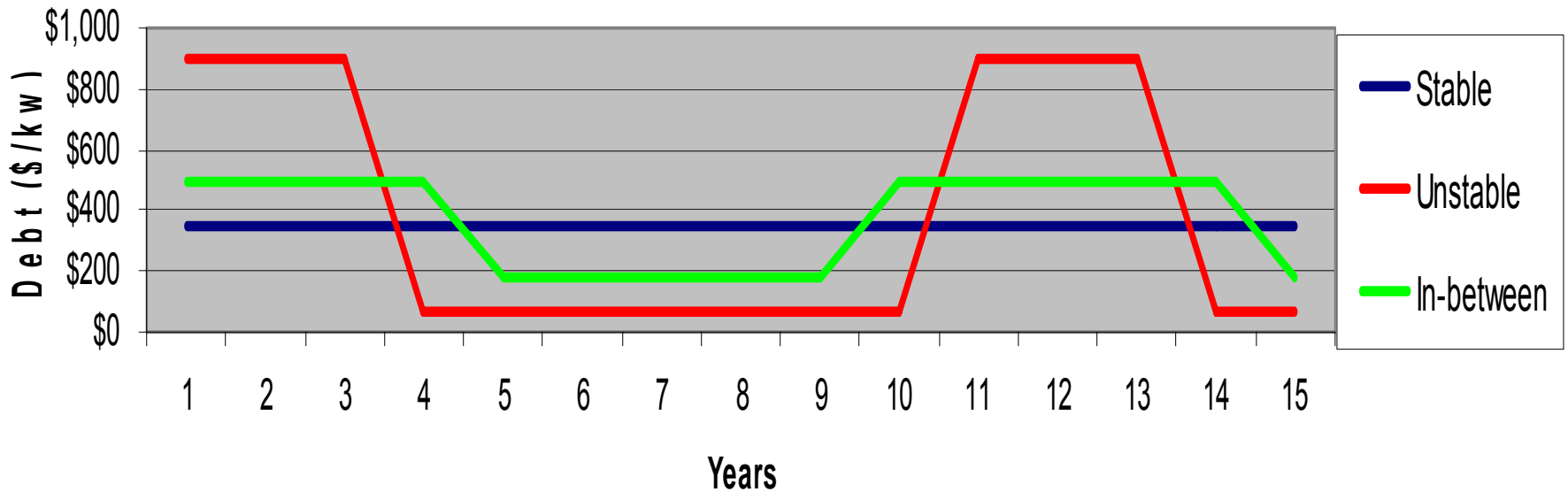
Structure of Markets Drive Cash Flow Volatility

Project Cashflows



Cash Flow Volatility Drives Financing Structure

Debt Permitted by Coverage Ratios



Financing Structure Determines Cost of Capital

(illustrative example)

		Stable	Unstable
Capital Structure	Debt	87%	18%
	Equity	13%	82%
Cost	Debt	7.5%	7.5%
	Equity	15.0%	20.0%
Tax rate		40%	40%
WACC		5.9%	17.2%

$$\text{WACC} = \% \text{ Debt} * \text{Cost of Debt} * (1 - \text{tax rate}) + \% \text{ Equity} * \text{Cost of Equity}$$

Capacity Prices Are Lower in a More Stable Market

	<u>Market Structure</u>	
	<u>Stable</u>	<u>Unstable</u>
WACC	5.9%	17.2%
Real Capital Charge Rate	6.1%	20.1%
Initial Capital Costs (\$/kw)	\$400	\$400
Annual Capital Charges (\$/kw-year)	\$24	\$80
FOM	\$10	\$10
Energy Margin	(\$2)	(\$2)
Capacity Price (\$/kw-year)	\$32	\$88

Capacity Prices Determine Consumer Costs

CONSUMER COSTS

\$/kwh

Market Structure

Stable

Unstable

Energy Costs

\$45

\$45

Other Costs

\$15

\$15

Capacity Price*

\$ 9

\$25

Total Costs

\$69

\$85

* at 40% load factor

Market Stability Favors More Efficient Generation Capacity

		Stable		Unstable	
		CT	Coal	CT	Coal
Capital Structure	Debt	87%	88%	18%	55%
	Equity	13%	12%	82%	45%
Costs	Debt	7.5%	7.5%	7.5%	7.5%
	Equity	15.0%	15.0%	20.0%	20.0%
Tax Rate		40.0%	40.0%	40.0%	40.0%
WACC		5.9%	5.8%	17.2%	11.5%
Real Capital Charge Rate		6.1%	6.0%	20.1%	12.2%
Capital Costs (\$/kw)		\$400	\$1,500	\$400	\$1,500
Annual Capital Charges		\$24	\$90	\$80	\$183
FOM		\$10	\$30	\$10	\$30
Energy Margin		(2)	(90)	(2)	(90)
Capacity Price (\$/kw-year)		\$32	\$30	\$88	\$123

Effect of Contract Term on Capital Charge Rate



Design Options for Market Stability

- **Extend effective date of auction far enough in the future to permit new entry**
- **Extend the term of the contract (the longer the better)**
- **Give RTO authority to “manage” new capacity**
- **Demand curves (but hard to get right)**

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